



Notification and Certification of Self-Implementing Cleanup and Disposal Plan for PCB Remediation Waste

Revision 1

239.1 Jackson Street
Lowell, Massachusetts
Watermark Project No.: 11405-02

Prepared by:

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Prepared for:

City of Lowell
Department of Planning and
Development
JFK Civic Center
50 Arcand Drive
Lowell, MA 01852





Watermark Project No.: 11405-02-0002B

**Notification and Certification of Self-Implementing
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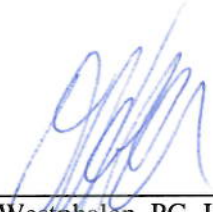
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239.1 Jackson Street
Lowell, Massachusetts

Prepared for:




**City of Lowell
Department of Planning and Development
JFK Civic Center
50 Arcand Drive
Lowell, MA 01852**



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Date



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Date

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EXECUTIVE SUMMARY

On behalf of the City of Lowell (the City), Watermark Environmental, Inc. (Watermark) has prepared this Notification and Certification of Self-Implementing Cleanup Plan – Revision 1 (Revised Plan) in accordance with 40 CFR 761.61(a)(3) to address polychlorinated biphenyl (PCB) impacts in the soil at the property formerly known as 307 Jackson Street, Lowell, Massachusetts. This Revised Plan specifically addresses the elevated concentrations of PCBs on a portion of Parcel 9, currently known as 239.1 Jackson Street (the Site). The PCB-impacted soil is regulated both under the Massachusetts Department of Environmental Protection (MassDEP) under the Massachusetts Contingency Plan (MCP), and by the United States Environmental Protection Agency (USEPA) under the Toxic Substance Control Act (TSCA).

Releases at the Site are a result of historic use of the Site and the surrounding parcels (the Redevelopment Area) for industrial purposes since the early 1800s. Historically, the Redevelopment Area housed mills, office buildings, a bleach house, a dye house, a boiler house, paint shop, machine shop, and repair shop. Environmental investigations at the Redevelopment Area have observed large quantities of historic debris (wood, brick, glass, ash) in the soil. PCBs in the soil at the Site may be attributed to buried historic caulking or paint. Given the documented site history and uses of the Site, it is considered that the release of PCB containing material occurred prior to 1978; specifically, prior to the mid-1970s, when the Site was utilized for manufacturing and industrial purposes. Based upon historical information, after the mid-1970s the Site was utilized for the storage of dry goods. Furthermore, it is understood that the property was vacant from the mid-1980s until redevelopment began in 2009. Therefore, the release did not likely occur after April 18, 1978¹.

Currently the City, along with Trinity Appleton Four LTD Partnership and Trinity Appleton LP (Trinity), is working to redevelop the Redevelopment Area and the surrounding properties, resulting in approximately 15 acres of new vibrant mixed-use neighborhood, which includes residences. The proposed remediation efforts being taken to address the PCB-impacted soil will prepare the Property for redevelopment efforts prior to the City transferring the Property to Trinity. Currently the PCB-impacted soil at the Site is located at a depth of approximately 10 feet or more below the ground surface and access to the Property is restricted by a perimeter fence.

Some of the previous investigations conducted at the Property, as well as the preparation of this plan and other required plans, are being funded by a Brownfields Assessment Grant (Brownfields Grant BF97184001), which was awarded to the City in 2009. Remediation efforts at the Site will be funded by one of two Brownfields Remediation Grants, co-issued under grant number BF96130901.

Watermark previously prepared a Notification and Certification of Self-Implementing Cleanup and Disposal of PCB Remediation Waste Plan (Original Plan) in August 2011. USEPA did not approve the Original Plan and provided comments on the Original Plan in September 2011. A copy of the USEPA comment letter on the Original Plan is included as Appendix D. In November 2011, representatives from Watermark, the USEPA, the City, Trinity, and Trinity's environmental consultant (McPhail Associates, Inc.) met to discuss the Original Plan, the USEPA's comment letter, and the steps necessary to address EPA's concerns. As a result of that meeting, additional soil sampling for PCBs in the subsurface at the Property was conducted in March 2012 and revisions were made to the proposed cleanup plan.

¹ The applicability of TSCA and associated requirements for cleaning up PCB releases depend partially upon when the release occurred relative to two dates: April 18, 1978 and July 2, 1979 [see 40 CFR 761.3, 761.50(b)(3)].

1.0 INTRODUCTION

On behalf of the City of Lowell (the City), Watermark Environmental, Inc. (Watermark) has prepared this Notification and Certification of Self-Implementing Cleanup and Disposal of Polychlorinated Biphenyl (PCB) Remediation Waste Plan – Revision 1 (Revised Plan) in accordance with requirements of 40 CFR Part 761.61 (a)(3). Currently the City own Parcels 8 and 9, hereafter referred to as “the Property”, and the parcel known as “New Road D.” This Plan pertains to work being conducted at 239.1 Jackson Street, formerly known as 307 Jackson Street on Parcel 9 (Figure 1-1). Specifically, this Plan addresses the remediation of PCB-impacted soil, referred to as the Disposal Site (the Site), in Parcel 9 (Figure 1-2). Remediation work being conducted as part of this Revised Plan is regulated by the United States Environmental Protection Agency (USEPA) under the Toxic Substance Control Act (TSCA) and the Massachusetts Department of Environmental Protection (MassDEP) under the Massachusetts Contingency Plan (MCP).

1.1 Background

Historically, the Property and the adjoining parcels (the Redevelopment Area) had been used for manufacturing and had housed mills, office buildings, a bleach house, a dye house, a boiler house, paint shop, machine shop, and repair shop. The Redevelopment Area was historically part of the Appleton Company Cotton Mill complex, which included a repair shop, boiler house, iron storage, dye house, bleach house, and machine shop. Beginning around 1950 the Redevelopment Area was occupied by Jackson Properties, which included loft buildings, a cotton house, and an office building. Additionally, portions of the Redevelopment Area were leased to small industrial businesses between the 1930s and the mid-1970s. Between 1975 and 2006, the Site was owned by Appleton Trust and was used for storage between the mid-1970s and mid-1980s. The Redevelopment Area was vacant from the mid-1980s until redevelopment began in 2009.

The City is currently working with a developer, Trinity Appleton Four LTD Partnership and Trinity Appleton LP (Trinity), in order to redevelop the Property. The redevelopment will result in the reinvention of approximately 15 acres of vacant and underutilized land, including the Redevelopment Area, as a new vibrant mixed-use neighborhood, which includes residences. Adjacent parcels to the south and southeast of the Property (Parcels 6 and 7) have already been redeveloped with the restoration ending in June 2011. Currently, Parcels 6 and 7 are fully occupied (Figure 1-2).

Numerous environmental investigations have been conducted at the Redevelopment Area. Based on site investigations, PCBs have been detected in soil at low concentrations across the Redevelopment Area. The source of PCBs in soil at the Redevelopment Area may be attributed to paint and caulking historically used on structures and buildings and may be in the soil as evidenced by the wood and other construction debris found in soil at the Property. No elevated concentrations of PCBs have been measured in soil below the historic fill layer. There is no known transformer release that the PCBs are associated with.

In October 2009 a Class B2 partial-RAO was filed for the Property. The RAO identified the contaminants of concern at the Property as being polynuclear aromatic hydrocarbons (PAHs), metals, polychlorinated biphenyls (PCBs) and volatile organic compounds (VOCs) identified in soil, and VOCs identified in groundwater. The vertical extent of impacted soil and groundwater at Parcels 8 and 9 was limited to the historic fill material. A Method 3 Risk Characterization was completed for the Property. Exposure Point Concentrations (EPCs) utilized in the Risk Characterization for PAHs, metals, PCBs and EPH fractions in soil were based upon the average of the concentrations detected, and the EPCs utilized for VPH fractions and VOCs were the maximum concentration detected. The maximum concentration of each contaminant detected in the monitoring wells was utilized as the EPC for groundwater. For indoor air, maximum concentrations of soil gas modified to account for dilution and attenuation were used as the basis for estimated indoor air EPCs. The Method 3 Risk Assessment concluded that soil and groundwater present at the time of the RAO presented a level of No Significant Risk for the current site use. An Activity and Use Limitation (AUL) was recorded for the two parcels with the Northern Middlesex County Registry of Deeds to maintain the condition of No Significant Risk when site usage changes after the redevelopment effort. The AUL maintains a condition of No Significant Risk through requiring:

- Only limited access is permitted to the Property, which is to be controlled by a fence no shorter than 6-feet high;
- Install and maintain asphalt pavement on the driveway easement located in the southwest corner of Parcel 8;
- Concrete slabs are to remain in place;
- Use of the property for multi-unit residential or commercial buildings (is permissible) provided the installation of a vapor intrusion mitigation system, such as a vapor barrier and under slab ventilation system, is incorporated into the design of any future buildings on the Property;
- Use of the Property for single-family residential dwellings, playground, daycare, recreational area, or other uses in which adults or children may come into contact with uncovered soil is prohibited;
- Placement of off-site fill material (if needed) over the existing ground surface for construction of roadways or driveways, without moving or displacing the existing on-site fill material;
- Growing of fruits and vegetables for human consumption is prohibited; and,
- Relocation of PCB, polynuclear aromatic hydrocarbon (PAH), and barium impacted soil in the AUL Area to areas outside of the AUL Area is prohibited unless an LSP renders an Opinion which states that such relocation is consistent with maintaining a condition of NSR.

In the fall of 2010, the City retained Watermark under a USEPA Brownfields assessment grant to conduct site investigation activities to further delineate PCB impacted soil in the subsurface at the Property in preparation for upcoming remediation efforts.

The results of the subsurface investigation were presented to the City in a report titled *Data Summary Report, Parcels 8 and 9 Site Assessment Activities*, dated January 2011. A summary of the results of the subsurface investigation of PCBs in soil are presented below:

- PCBs in soil were detected above 500 mg/kg in two samples. This soil is subject to the USEPA's TSCA regulations because the concentrations exceeded 50 mg/kg;
- The soils with the highest impacts of PCBs (from 17 to 2,200 mg/kg) are in the vicinity of boring SB-108 from depths of 14 to 17.3 feet below grade [elevation 74.18 to 77.48 feet NGVD 1992] (Figure 1-3). Two of the samples, with concentrations of 640 mg/kg and 2,200 mg/kg, exceed MCP Upper Concentration Limit (UCL) for PCBs of 100 mg/kg. These soils contained significant amounts of wood and other building materials; therefore, the presence of PCBs may be attributed to caulking and/or paint; and
- The elevated concentrations of PCBs triggered a new 120-day reporting condition under the MCP. The release was reported to the MassDEP on January 26, 2011 and assigned the Release Tracking Number (RTN) 3-29781.

In August 2011, the PCB release at Parcels 6 and 7 was addressed with a Class B2 partial RAO Statement under RTN 3-26095. The partial RAO identified the contaminants of concern for Parcels 6 and 7 as PAHs, metals, PCBs, and VOCs identified in soil, and VOCs identified in groundwater and sub-slab soil vapor samples. Similar to Parcels 8 and 9, the vertical extent of impacted soil and groundwater at Parcels 6 and 7 was limited to the historic fill material. The horizontal extent of impacted media at Parcels 6 and 7 were limited based on the sub-surface penstock and the canals to the north and south of the Redevelopment Area. A Method 3 Risk Characterization was completed. Exposure Point Concentrations (EPCs) utilized in the Risk Characterization for PAHs, metals, PCBs and EPH fractions in soil were based upon the average of the concentrations detected, and the EPCs utilized for VPH fractions and VOCs were the maximum concentration detected. The maximum concentration of each contaminant detected in the monitoring wells was utilized as the EPC for groundwater. For indoor air, maximum concentrations of soil gas modified to account for dilution and attenuation were used as the basis for estimated indoor air EPCs. The Method 3 Risk Assessment concluded that soil and groundwater present at the time of the RAO presented a level of No Significant Risk for the current site use. An Activity and Use Limitation (AUL) was recorded for the two parcels with the Northern Middlesex County Registry of Deeds



to maintain the condition of No Significant Risk when site usage changes after the redevelopment effort. The AUL maintains a condition of No Significant Risk through requiring:

- A minimum of three feet of clean soil is placed in all landscaped areas, and all non-landscaped areas be covered with concrete or asphalt
- Concrete and paved areas must be well maintained with potholes and large cracks repaired within 6 months
- Excavations must be completed in accordance with a Soil Management Plan and a Health and Safety Plan (both of which must be prepared by a Licensed Site Professional [LSP]), and must be completed within 6 months and covered with a comparable barrier to the one previously in place immediately following the completion of the project
- The subject property must not be used for a single family residence or for fruit and vegetable gardening
- Relocation of soil from within the AUL area to areas outside of the AUL or off-site must be done so under the supervision of an LSP and in accordance with the Remediation Waste Management Provisions of the MCP at 310 CMR 40.0030 and 310 CMR 40.0040

Watermark previously prepared a Notification and Certification of Self-Implementing Cleanup and Disposal of PCB Remediation Waste Plan (Original Plan) in August 2011. In preparing the Original Plan, Watermark reviewed the documents filed with the MassDEP, the USEPA, and/or the City summarizing the site assessments within the Redevelopment Area. These reports include:

- Phase I Initial Site Investigation and Tier Classification, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, dated July 31, 2007, prepared by Environmental Compliance Services, Inc. (ECS);
- Phase I Environmental Site Assessment and Subsurface investigation Report, 307 Jackson Street, Lowell, MA, dated August 2006, prepared by Watermark;
- Phase I Initial Site Investigation; Phase II Conceptual Scope of Work, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, dated August 27, 2009, prepared by McPhail Associates Inc. (MAI);
- Phase II Comprehensive Site Assessment, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, dated September 24, 2009, prepared by MAI;
- Release Abatement Measure (RAM) Plan, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, October 9, 2009, prepared by MAI;
- Form 1075, Notice of Activity and Use Limitation (AUL), 307 Jackson Street, RTN 3-26095, dated October 13, 2009, prepared by MAI;
- Partial Response Action Outcome Statement, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, dated October 14, 2009, prepared by MAI;
- Risk Based Approval, Former Appleton Mills, 307 Jackson Street, Lowell, MA dated July 21, 2010, prepared by MAI;
- Data Summary Report, Parcels 8 and 9 Site Assessment Activities, dated January 2011, prepared by Watermark; and,
- New Street D; Lowell, Massachusetts, Final (PCB) Completion Report, dated April 26, 2011, prepared by MAI.

USEPA did not approve the Original Plan and provided comments on the Original Plan in September 2011. A copy of the USEPA comment letter on the Original Plan is included as Appendix D. In November 2011, representatives from Watermark, the USEPA, the City, Trinity, and Trinity's environmental consultant (McPhail Associates, Inc.) met to discuss the Original Plan, the USEPA's comment letter, and the steps that needed to be made to move forward. As a result of that meeting, a plan to address EPA's concerns was developed and included amongst other items, additional soil sampling for PCBs throughout Parcels 8 and 9. Prior to conducting an additional round of PCB soil sampling at the Property, a Site Specific Quality Assurance Project

Plan (SS-QAPP) Addendum was prepared February 2, 2012 and approved by the USEPA on March 8, 2012. The additional subsurface PCB soil sampling effort was conducted between March 28 and 29, 2012. Results for PCBs in soil from this most recent sampling event were below regulatory limits of both MCP and TSCA. Based on the results of the March 2012 sampling event, this Revised Plan has been prepared.

1.2 Purpose and Scope

This Revised Plan was written to satisfy the requirements for Notification and Certification of Self-Implementing Cleanup and Disposal of PCB Remediation Waste stipulated under 40 CFR 761.61(a)(3) and relies, in part, on the above documents previously developed in support of site investigation activities. The above documents were submitted to the MassDEP, USEPA, or the City under separate cover; additional copies are available upon request. The Site and adjacent parcels were previously closed with a Partial Class B2 Response Action Outcome (p-RAO); however, concentrations of PCBs identified in the soil at the Site in post-RAO investigations were significantly above those reported in the p-RAO, therefore triggered a new MCP notification condition. The p-RAO relied upon two separate AULs, one for Parcel 8 and one for Parcel 9, recorded at the Middlesex County Registry of Deeds. Work conducted at the Site needs to adhere to the conditions set forth in the AUL recorded for the Site. The remainder of this Revised Plan is formatted consistent with 40 CFR 761.61(a)(3).

1.2.1 Content of Notice (Revised Plan) pursuant to 40 CFR 761.61(a)(3):

[A] The nature of the contamination including the types of materials contaminated.

Soil is the only media shown to have been impacted by PCBs at the Redevelopment Area. The presence of PCB-impacted soil at the Redevelopment Area is believed to be related to historic urban fill materials used at the Redevelopment Area. Given the documented site history and uses of the Redevelopment Area, it is considered that the release of PCB containing material (such as caulking or paint) occurred prior to 1978. Specifically, prior to the mid-1970s the Redevelopment Area was utilized for manufacturing and industrial purposes. Based upon historical information, after the mid-1970s the Redevelopment Area was utilized for the storage of dry goods. Furthermore, it is understood that the property was vacant from the mid-1980s until redevelopment began in 2009. Therefore, the release did not likely occur after April 18, 1978.

[B] A summary of the procedures used to sample contaminated and adjacent areas and a table or cleanup site map showing PCB concentrations measured in all pre-cleanup characterization samples.

Procedures used to sample the Site and adjacent areas are summarized in Section 2.0, PCB Characterization Activities. Watermark's 2010 sampling effort was conducted in accordance with Watermark's Generic Quality Assurance Project Plan (QAPP) for Brownfields Assessment and Remediation Site (RFA 08063), which was approved by the USEPA on January 9, 2008. An SS-QAPP Addendum was prepared for the 2010 site characterization activities on July 13, 2010, which was approved by the USEPA on August 6, 2010. Prior to the March 2012 characterization activities, a second SS-QAPP Addendum was prepared and approved by the USEPA on March 8, 2012.

For the work described herein, the MCP Release Abatement Measure (RAM) Plan (to be written) will serve as the SS-QAPP Addendum. Tables and maps showing a summary of all pre-cleanup characterization results for analysis of PCBs are attached and referenced in Section 3.0, Site Remedial Implementation Plan.

[C] The location and extent of the identified contaminated area(s), including topographic maps with sample collection sites cross referenced to the sample identification numbers in the data summary from [B].

Maps depicting the location and extent of contaminated areas cross-referenced to sample identification numbers are included with this Revised Plan in Figures 1-3 and 2-1, and Tables 2-1 and 2-2 referenced in Section 3.0, Site Remedial Implementation Plan.

[D] A cleanup plan for the site including schedule, disposal technology, approach and contingencies in the event of the discovery of higher concentrations, wider distributions or other obstacles that would force a change in the cleanup approach.

The proposed cleanup plan with schedule, disposal technology, and contingencies is included in Section 3.0, Site Remedial Implementation Plan.

[E] A written certification signed by the owner of the property.

A signed certification by the Site owner, the City, is included in Appendix A.

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2.0 PCB CHARACTERIZATION ACTIVITIES

The following sections discuss the PCB characterization activities which have taken place from 2006 to 2010 over the entire Redevelopment Area. The initial investigations are related to the release RTN 3-26095 which includes all of the Redevelopment Area, formerly 307 Jackson Street. In the fall of 2010 Watermark conducted further characterization activities at the Property, which are described in Section 2.1. Concentrations of PCBs in soils at the Property exceeded those previously reported, triggering a new MCP notification condition. The new release was assigned the release tracking number RTN 3-29781.

As a result of the November 2011 meeting with USEPA and other interested parties, an additional round of PCB delineation soil sampling was conducted in March 2012. This round of PCB soil sampling was limited to the Property since Parcels 6 and 7 are currently developed. Sampling methods are discussed in Section 2.2, and results from this sampling round are discussed in Sections 2.1 and 2.2 as appropriate.

2.1 PCB Characterization on Adjacent Parcels

An MCP Phase I investigation of the Redevelopment Area was conducted by ECS in 2006. Based on a review of reports prepared by ECS, in 2006 eight soil borings, each of which was completed as a monitoring well, were advanced with a hollow stem auger (HSA) drill rig as part of a site investigation. Soil samples collected from 2-foot split spoon samplers from the borings were analyzed for:

- VOCs by USEPA Method 8260B;
- Acid-extractable semi-volatile organic compounds (SVOCs) by US EPA Method 8270C;
- Extractable petroleum hydrocarbons (EPH) by MADEP EPH Method;
- PCBs by USEPA Method 8082 (extraction by Method 3546, microwave extraction);
- Priority pollutant 13 metals by USEPA Method 6010B/7471A; and
- Asbestos by EPA's Interim Method for Determination of Asbestos in Bulk Insulation, 1982.

PCB results from these eight soil boring are discussed in the applicable sections below. Approximate monitoring well locations are shown in Figure 1-3.

An ASTM Phase I Environmental Site Assessment and Subsurface Investigation was completed by Watermark in August 2006 on behalf of the City of Lowell. Watermark advanced soil borings with an HSA drill rig, collected and analyzed soil samples from a 2-foot split spoon sampler, and collected and analyzed groundwater samples from existing wells. Soil samples were analyzed for:

- VOCs by USEPA Method 8260B;
- SVOCs by US EPA Method 8270C;
- EPH by MADEP EPH Method;
- Volatile petroleum hydrocarbons (VPH) by MADEP VPH Method;
- PCBs by USEPA Method 8082 (extraction by Method 3546, microwave extraction); and
- Metals by USEPA Method 6010B/7471A.

PCB results from this investigation are discussed in appropriate sections below. Approximate investigation locations are shown in Figure 1-2.

Separate phases of subsurface investigations were subsequently completed across the Redevelopment Area by MAI. The first phase of investigation, completed at Parcels 6, 7, and 8 from March 6 through March 13, 2008, was completed outside of the footprints of the existing buildings and consisted of seven borings advanced with an HSA drill rig (MAI-1 through MAI-7) and twelve test pits (TP-1 through TP-12). A second phase of investigation, performed across the Redevelopment Area from May 27 through June 10, 2009, consisted of nine borings (MAI-8 through MAI-16) and eight test pits (TP-20 through TP-27). Soil samples were collected with a

2-foot split spoon sampler or composited over an entire test pit (see Table 2-1 for exact sample intervals), and were analyzed for:

- VOCs by MCP 8260B/5035-high;
- Polynuclear aromatic hydrocarbons (PAHs) by MCP 82790C – SIM;
- Metals by MCP 5000/7000 series;
- PCBs by 8082 (extraction by Method 3546, microwave extraction).

Approximate locations of these sampling locations are shown on Figure 1-3.

During May and June 2010, two additional rounds of test pits were excavated in the New Road D Parcel by MAI. The test pits were excavated to facilitate soil sampling in an attempt to define the southern, eastern and western extents of PCB-impacted soil. Samples collected during the 2010 investigation were analyzed for PCBs by 8082 with extraction method 3540C, soxhlet extraction. These samples were collected over a 2-foot interval. Watermark reviewed the sampling procedures, sample locations, sampling interval, and laboratory data packages from these sampling efforts. The data are representative of the conditions in New Road D at the time, and the data is useable for making cleanup decisions. Approximate locations of these test pits are shown on Figure 1-3.

A description of soil sample results for PCBs by parcel is provided below.

Parcel 6

Parcel 6 is located south of the western portion of the Property. A total of four soil samples were collected and analyzed for PCBs from Parcel 6. Of the four samples analyzed, only one sample had a detection above the laboratory's reporting limit. The detection was in sample B-125 from 10 to 12 feet below ground surface (ft bgs). The detection 0.15 mg/kg of aroclor 1260 is below the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard² of 3 mg/kg and the USEPA's TSCA Cleanup Criteria for High Occupancy Areas (HOAs) of 10 mg/kg³. Sample locations for Parcel 6 are shown on Figure 1-3 and sample results are presented in Table 2-1. This parcel has achieved MCP closure with a Class B2 partial RAO as discussed in Section 1.1.

Parcel 7

Parcel 7 is located south and southeast of the Site. A total of 11 soil samples were collected and analyzed for PCBs from Parcel 7. Of the 11 samples analyzed, two samples had detections above the laboratory's reporting limit. The detections were in sample B-126 from 1 to 3 ft bgs, and from sample TP-26 S-1 (0-7') from 0 to 7 ft bgs. Depths given for the samples are measured from the pre-construction ground surface. Sample locations in Parcel 7 are currently covered by pavement or clean fill material. Both detections are below the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard of 3 mg/kg and the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg. Sample locations for Parcel 7 are shown on Figure 1-3 and sample results are presented in Table 2-1. This parcel has achieved MCP closure with a Class B2 partial RAO as discussed in Section 1.1.

² MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standards are applicable for the soil across the Remediation Area. The soil is classified as an S-3 soil because the impacted soils are inaccessible as they are either under a building or permanent structure, or are located at depth. Furthermore, an AUL has already been recorded for the Redevelopment Area, further restricting access. Groundwater is characterized as GW-2 due to the presence of occupied buildings on Parcels 6 and 7, and the planned future occupied buildings on Parcels 8 and 9 (the Property). Groundwater is also characterized as GW-3 as all groundwater within the commonwealth of Massachusetts is characterized as GW-3.

³ The clean-up level of 10 mg/kg for PCBs applicable in this case as the material is being addressed as part of a self-implementing cleanup of soil in a future High Occupancy Area which will be located under a cap in the future. The Property is being designated as a High Occupancy Area based on its future use as a residence, and the cap being placed on the PCB impacted area will consist of no less than 10 inches (25 cm) of compacted soil with concentrations of <1 mg/kg of PCBs which meets the requirements of a cap set forth in CFR 264.310(a). Note that a soil cap, if installed, will need to be no less than 36 inches in thickness to comply with MCP requirements. A deed restriction will also be recorded to prevent access to the PCB-impacted soil.

Parcel 8

Parcel 8 is located east of the Site. A total of 46 soil samples were collected and analyzed for PCBs from Parcel 8 between 2006 and 2012. Of the 46 samples analyzed, 30 samples had detections above the laboratory's reporting limit. Of the 30 samples with detections of above the laboratory's reporting limit, 3 samples exceed the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard of 3 mg/kg, but not the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg. The three samples which exceeded the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard were samples SB-112 (10-12'), SB-114 (9-11'), and TP-304 S-2 (2-4') with concentrations of 6 mg/kg of aroclor 1260 and 7.4 mg/kg and 8.47 mg/kg of aroclor 1254 (maximum concentration), respectively. Although these individual samples exceed the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard, the calculated Exposure Point Concentration (EPC) for Parcel 8 is below the applicable MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standards, and the TSCA Standard for soil in an HOA. Sample locations for Parcel 8 are shown on Figure 1-3 and sample results are presented in Table 2-1.

This part of the Property has achieved MCP closure with a Class B2 partial RAO as discussed in Section 1.1.

In March 2012, in order to address concerns raised by the USEPA in their September 28, 2011 letter, additional soil samples were collected from Parcel 8. The locations of these samples are presented on Figure 1-3, and the analytical results from this sampling round are included in the discussion above. None of the samples collected in March 2012 exceeded MCP or TSCA standards for PCBs in soil.

New Street D

A total of 10 soil samples were collected and analyzed for PCBs from the New Street D portion of the Property. Of the 10 samples analyzed, 9 samples had detections above the laboratory's reporting limit. Of the nine samples with detections of above the laboratory's reporting limit, six of the soil samples exceed both the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard of 3 mg/kg and the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg. The six soil samples which exceed both cleanup criteria ranged in concentration from 13 mg/kg to 185 mg/kg with the maximum concentration being detected in sample TP-303 S-1 (0-2'). Note that although this sample was shallow at the time of collection, the soil in question was subsequently covered with approximately 12 feet of clean imported fill as part of construction activities. Sample locations for Parcel 8 are shown on Figure 1-3 and sample results are presented in Table 2-1.

PCBs identified within the New Street D portion of the property have limited mobility and the primary routes of exposure to humans would be through direct contact, incidental ingestion and inhalation of dust. Given the paved surface road, the depth from finished grade of the elevated PCB concentrations (a minimum of 10 feet below the new roadway, and the highest PCB concentration will be approximately 14 feet below the new roadway), and that the utilities are to be located above the PCB impacted fill material, the exposure pathway to the PCBs is mitigated. Therefore, in accordance with 40 CFR 761.61(c), a risk-based approach was proposed to address the release of PCBs within the New Street D portion of the Property. On December 7, 2010, the U.S. EPA issued a letter to the City of Lowell entitled "PCB Risk-Based Disposal Approval under 40 CFR 761.61 (c)". The letter included approval conditions that the City of Lowell must comply with. MAI completed the work and recorded a Deed Restriction for New Road D. A PCB Final Completion Report was submitted to the USEPA by MAI on April 26, 2011.

2.2 Parcel 9 PCB Delineation

Nine soil samples were collected from various locations across Parcel 9 between 2006 and 2009. Three of the nine samples, MW-2L/ECS-6, TP-21 S1, and TP-22 S1, exceeded the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard of 3 mg/kg. Sample TP-22 S1, which was collected over an 8-foot interval, exceeds the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg with a concentration of 13.1 mg/kg.

As of October 2009, this part of the Property had achieved MCP closure with a Class B2 partial RAO as discussed in Section 1.1.

In the fall of 2010, Watermark delineated the impacts of PCBs to the soil in the vicinity of previously advanced test-pits, TP-21, TP-22, and TP-23, in preparation for upcoming remediation efforts (Figure 2-2). The fall 2010 investigation included samples on a 10-foot grid, collected over no more than a 2-foot vertical interval, and were

analyzed for PCBs via soxhlet extraction. The methodology used during this sampling effort is discussed in Section 2.2.1, and the analytical results from this sampling round are discussed in Section 2.3.

In March 2012, in order to address concerns raised by the USEPA, additional soil samples were collected from Parcel 9. The methodology used during this sampling effort is discussed in Section 2.2.2, and the analytical results from this sampling round are discussed in Section 2.3.

2.2.1 Fall 2010 Sampling

The soil sampling was conducted in two mobilizations, with the second mobilization focusing on further delineating the elevated levels of PCBs detected in the first round of sampling. The following sections describe Watermark's fall 2010 sampling effort.

2.2.1.1 Soil Sampling Procedures

GeoSearch, Inc. of Fitchburg, Massachusetts, was the drilling contractor used to perform the field investigation. Soil samples were collected on a 10-foot grid in accordance with TSCA regulations 40.761 Subpart O using a hollow stem auger drill rig via a split-spoon sampler. Note that since the Site is undergoing construction activities, approximately 10 feet of clean soil had been added to the study area, as part of the construction of New Street D, since the initial soil borings and test pits investigations took place. Therefore, in accordance with the SS-QAPP, borings were advanced with an auger and without collecting split-spoon samples through the recently placed fill at the Site until the depth which represented the ground surface during the initial Site Investigations was reached. Continuous soil sampling was conducted from this target depth, which represented the previous ground surface, to ten feet below the target depth, in a series of 2-foot split-spoon samples. Soil samples were characterized in the field by a Watermark scientist. In addition, soil samples were screened for signs of contamination in the field using visual, photoionization detector (PID) jar headspace, and olfactory indicators. Field observations were documented in the field boring log forms which were previously submitted to the City as part of the Data Summary Report, Parcels 8 and 9 Site Assessment Activities, dated January 2011. Cuttings from the drilling process and equipment decontamination water were drummed and stored on-site for later disposal. Disposal documents are presented in Appendix B. The bottom ten feet of each boring was backfilled using grout, while the upper part of the boring (which represented the recently placed fill material) was backfilled with recently placed fill material.

Soil samples were collected from each of the split-spoons and submitted to a laboratory for analyses of PCBs. The first round of soil samples, from boring SB-101 through SB-109, were submitted for PCB analyses and were extracted via Method 3546, microwave extraction. Once the PCB results were received, these samples were resubmitted for extraction and reanalysis via PCB 3540C, soxhlet extraction method.

Once data from the first round was reviewed, five additional borings were advanced to further delineate PCB concentrations detected in borings from the first round. The second round took place on October 14, 2010. GeoSearch advanced the five borings, SB-201 through SB-205, as shown on Figure 2-2. The advancement of the borings, characterization of the soil, collection of soil samples, backfilling of the borings, and handling of the investigation derived waste, were conducted in the same manner as they were during the first round. Samples from the second round of sampling, borings SB-201 through SB-205, were analyzed via the PCB Soxhlet Extraction Method. Samples from borings SB-202 and SB-205 were placed on-hold at the laboratory to await the results from SB-203 and SB-204 to see if further delineation was necessary. On November 5, 2010 three additional samples, SB-202 (12-14'), SB-202 (16-18'), and SB-205 (12-14'), were analyzed for PCBs via 8082 and extraction method PCB 3540C, the soxhlet extraction method, to further aid in the delineation of PCBs at the Site.

During both rounds, field sampling equipment (stainless steel split-spoons, spoons, and bowls) was decontaminated in between the collection of each sample to avoid cross contamination from one depth interval to the next. Decontamination was performed by washing the equipment with a solution of Alconox and water, and then rinsing the equipment with clean water. Four rinsate samples were collected during the first mobilization in accordance with the SS-QAPP Addendum by running laboratory grade distilled water over a decontaminated stainless steel spoon and bowl, then collecting the water in sample containers. These samples



were analyzed for the presence of PCBs. Results for the four rinsate samples were all non-detect above the laboratory reporting limit.

Throughout the field investigation, a total of four duplicate samples were collected and analyzed in accordance with the SS-QAPP. Three of the duplicate samples were soil samples associated with the first round of sampling, and the fourth duplicate sample was a soil sample associated with the second sampling round. Results are discussed in Section 2.3.

2.2.1.2 Field Observations

Based on field observations, soil was characterized as urban fill material and consisted primarily of fine sand with lesser amounts of fines, medium to coarse sand, and gravel. The fill material also included varying amounts of brick, concrete, wood, mortar, plastic, glass, felt, slag, coal, and ash. These observations are consistent with previous observations in this area.

Odors were observed at nine boring locations: SB-103, SB-105, SB-106, SB-107, SB-109, SB-201, and SB-205. Black staining was observed at eight boring locations: SB-103, SB-104, SB-107, SB-109, SB-201, and SB-205. These observations are consistent with previous observations in this area. There is no correlation between elevated concentrations of PCBs in soil and the observation of staining or odor.

PID jar headspace readings ranged from background to 1,243 parts per million Volume (ppmV), which was detected at boring SB-103 at a depth of 14-16 feet below grade [elevation 76.85 to 74.85 feet NGVD 1992]. High headspace readings are consistent with previous observations in this area.

2.2.2 March 2012 Sampling

In March 2012, in order to address concerns raised by USEPA in their September 28, 2011 letter, Watermark conducted another round of PCB soil sampling at the Property.

2.2.2.1 Soil Sampling Procedures

TDS, Inc. of Sterling, Massachusetts, was the drilling contractor used to perform the field investigation. Soil samples were collected from nine additional boring locations at the Property using a hollow stem auger drill rig via a split-spoon sampler. Prior to drilling, each of the boring locations was surveyed, and the current elevations compared to the elevations prior to redevelopment efforts. In areas where clean, imported fill had been added for construction purposes the imported fill was augered through to reach the original surface grade prior to collecting soil samples. Continuous soil sampling was conducted the depth which represented the previous ground surface, to ten feet below the target depth, in a series of 2-foot split-spoon samples. Soil samples were characterized in the field by a Watermark scientist. In addition, soil samples were screened for signs of contamination in the field using visual, PID jar headspace, and olfactory indicators. Cuttings from the drilling process were used to backfill the boring from which they were generated.

Decontamination procedures were performed, and quality assurance samples were collected in accordance with the 2012 SS-QAPP Addendum, and as described in Section 2.2.1.1.

Soil samples were collected from each of the split-spoons and submitted to a laboratory. The samples from the uppermost and lower most intervals, providing there was enough sample recovery, were analyzed for PCBs via PCB 3540C, soxhlet extraction method. The remaining soil samples were held by the laboratory for possible analysis following the results of the samples which were analyzed.

Results of this sampling effort are discussed in Section 2.3.

2.2.2.2 Field Observations

Based on field observations, soil was characterized as urban fill material and consisted primarily of fine sand with lesser amounts of fines, medium to coarse sand, and gravel. The fill material also included varying amounts of brick, concrete, wood, mortar, clinkers, slag, coal, and ash. These observations are consistent with previous observations in this area.

No odors or staining were observed in any of the borings advanced as part of the March 2012 sampling effort. The maximum PID jar headspace reading was 0.7 ppmV, which was only slightly above background concentrations in the area which ranged from non-detect to 0.2 ppmV.

2.3 Analytical Results (Fall 2010 and March 2012)

Soil samples were analyzed for PCBs as stated in Section 2.0. Soil analytical results for Parcel 9 are presented in Table 2-2, and the Data Analytical Packages are included in Appendix C. Data in Table 2-1 are compared to the TSCA cleanup standard for PCBs in soil with a cap in a High Occupancy Area (HOA). The TSCA cleanup standard was selected as a possible appropriate TSCA cleanup standard for the Site.

Of the 79 analytical soil samples collected for PCB analysis at Parcel 9, seven samples exceeded the TSCA cleanup standard of 10 mg/kg. The seven samples which exceeded TSCA cleanup standards are all located within the bounds of the Site, and were delineated as part of the Fall 2010 sampling effort. Sampling results for PCBs in soil samples collected outside of the Site, but within Parcel 9 between 2006 and 2012 are all below both MCP and TSCA standards.

As discussed above, extensive sampling has been performed within the bounds of the Site such that the soil impacts have been well characterized vertically (at 2-foot intervals) and horizontally (at 10-foot intervals). The analytical results are presented graphically on Figure 2-1, displaying the analytical results by the elevation of the soil.

The only PCB aroclor detected was aroclor PCB 1254. Samples exceeding the TSCA cleanup standard ranged from 17 to 2,200 mg/kg, with the highest detection in SB-108 at a depth of 16 to 17.3 feet below ground surface. Two of the soil samples, SB-108 (14-16) and SB-108 (16-17.3), exceeded 50 mg/kg at concentrations of 640 mg/kg and 2,200 mg/kg respectively. Soils which exceed 50 mg/kg of PCBs are regulated under the US EPA's TSCA program. Both of these soil samples were noted as having a large quantity of wood in the sample interval; however, no oil or petroleum impacts were noted. The concentrations of PCBs in soil are not consistent with the Class B2 partial-RAO for RTN 3-26095, which includes Parcels 8 and 9.

2.4 Summary of Groundwater Sampling Results

Groundwater at the Property has been sampled periodically for PCBs since 2006. Table 2-3 presents a summary of the sampling results for PCBs at the Property. PCBs have never been detected above the laboratory's minimum reporting level, and therefore PCBs in groundwater are not viewed as an issue at the Property. The average depth to groundwater across the Property is 9 feet to over 20 feet below ground surface (Figure 3-1). Groundwater at the Property generally flows to the north towards the Lower Pawtucket Canal (Figure 3-2).

2.5 Summary of Required PCB-Impacted Soil Remediation

Parcels 6, 7, 8, and the majority of Parcel 9 (excluding the Site) do not require remediation under the USEPA's TSCA Program as concentrations of PCBs in soil were below the TSCA cleanup standard and an adequate amount of soil sampling has been performed. Although some individual samples from Parcels 6, 7, 8, and the majority of Parcel 9 (excluding the Site) exceeded the Method 1 S-3/GW-2 and S-3/GW-3 Soil Cleanup Standards, the parcel-wide Exposure Point Concentration (EPC) is below the Soil Cleanup Standard and no Hot Spots were detected, remediation of PCBs in soil is not necessary at Parcels 6, 7, 8, and the majority of Parcel 9 (excluding the Site) per the MCP; furthermore, each discrete result is below the USEPA's TSCA Cleanup Criteria for HOAs.

The New Street D Parcel had detections above the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg. To address these elevated concentrations of PCBs in soil, MAI submitted a Risk Based Approval to the USEPA on June 12, 2010. The Risk Based Approval stated that the detected PCBs in the New Road D are a minimum of 10 feet below the new roadway, and the highest PCB concentration are approximately 14 feet below the new roadway (approximate elevation 98 feet NGVD 1998). Utilities within the roadway are located above the PCB-impacted soil. A deed restriction has been recorded limiting access to this soil. On December 7, 2010, the U.S. EPA issued a letter to the City of Lowell entitled "PCB Risk-Based Disposal Approval under 40 CFR 761.61 (c)". The letter included approval conditions that the City of Lowell must comply with.

PCBs identified below New Street D have limited mobility and the primary routes of exposure to humans would be through direct contact, incidental ingestion and inhalation of dust. Given the paved surface road, the depth from finished grade of the elevated PCB concentrations and that the utilities are to be located above the PCB impacted fill material, the exposure pathway to the PCBs has been eliminated. Therefore, in accordance with 40 CFR 761.61 (c), and the USEPA approval letter dated December 7, 2010, the PCB release located under the road has been properly remediated. On April 26, 2011, MAI submitted a PCB Remediation Final Completion Report to the USEPA, documenting the Site's closure using Risked Based Approval and compliance with the conditions set forth in the USEPA's approval letter such as capping of the soil with both soil and asphalt.

As all other areas of PCB impacted soil have been properly addressed and no longer pose a risk, only the Site, located in a portion of Parcel 9, currently requires remediation of PCB-impacted soil under TSCA and the MCP. By addressing concerns raised by the USEPA after submitting the Original Plan and modifying the proposed remediation plan, Watermark and the City are submitting this Revised Plan with the intent of receiving an approval letter to proceed with the planned remediation.

3.0 SITE REMEDIAL IMPLEMENTATION PLAN

The following sections outline the remediation effort which will take place to address the PCB-impacted soil at the Site, located in a portion of Parcel 9.

3.1 Cleanup Goals

NOTE

Due to the concentrations of PCBs in the soil and the requirements of the MCP and TSCA, soil at the Site needs to be addressed in order to protect public health and welfare, specifically for any possible future residents at the Site. Remediation goals for soil at the Site are to:

- Achieve the TSCA clean-up level of no soil on the Site with a concentration of PCBs above 10 mg/kg⁽⁴⁾ (Maximum concentration in soil <10mg/kg);
- Meet the MCP Method 1 Soil Cleanup Standards for S-3/GW-2 and S-3/GW-3 with an EPC average for PCBs in soil of less than 3 mg/kg;
- Achieve a condition of No Significant Risk (NSR) for PCBs in soil with respect to the MCP and be in compliance with TSCA cleanup requirements; and
- Prepare the Site, from an environmental standpoint, to support redevelopment.

3.2 Remedial Implementation Plan

The following sections outline the remediation effort which will be used at the Site to address PCBs in Soil. The remediation effort will be conducted in accordance with this Revised Plan, and a post-RAO RAM Plan, which will be submitted to the MassDEP prior to work commencing at the Site.

3.2.1 Overview

Soil samples with PCB concentrations greater than 10 mg/kg were collected from SB-105, SB-108, SB-203, and SB-204 (Figure 2-2). The area of elevated PCB concentrations is bordered by samples with concentrations of PCBs less than 9 mg/kg as follows: to the west by borings SB-202, to the north by SB-103, SB-104, SB-102 and TP-23, and to the east by SB-106, and SB-205. Investigation efforts did not extend to the south because the soil to the south has already been addressed by MAI with EPA consent under a Risk Based Approval.

The targeted soil samples with elevated PCB concentrations elevated were collected between elevations 74.18 and 80.85 feet NGVD 1992. Soil above and below the targeted elevations have concentrations of PCBs less than 9 mg/kg. As a conservative measure, the proposed remediation effort will include excavation of soil between elevation 73.0 to 82.0 feet NGVD 1992 at the above mentioned sample locations (Figure 2-1). Note that the impacted soil is located approximately 10 to 16 feet below the current ground surface. Figure 3-1 presents a cross-section through the Site showing the relative depths of the impacted material and the initial ground surface prior to redevelopment activities. The impacted soil will then be loaded onto trucks and transported to a permitted off-site disposal facility.

The City will bid out and secure a separate contractor to excavate, manage, dispose of excavated soils off-site, and to backfill the excavation. Watermark will assist the City in preparing the bid specification package; including, compiling geotechnical data and performance specifications for the sheet piling, designating soil stockpiling procedures, designating the required erosion control measures, and designing the post-excavation sampling plan. The Final Bid Package will include the following elements:

⁽⁴⁾ The clean-up level of 10 mg/kg for PCBs applicable in this case as the material is being addressed as part of a self-implementing cleanup of soil in a future High Occupancy Area which will be located under a cap in the future. The Property is being designated as a High Occupancy Area based on its future use as a residence, and the cap being placed on the PCB impacted area will consist of no less than 10 inches (25 cm) of compacted soil with concentrations of <1 mg/kg of PCBs which meets the requirements of a cap set forth in CFR 761.61(a)(7), 761.75(b), and 264.310 (a). Note that a soil cap, if installed, will need to be no less than 36 inches in thickness to comply with MCP requirements. A deed restriction will also be recorded to prevent access to the PCB-impacted soil.

- Design package including:
 - General detail, cross-section, and note drawings; and
 - Geotechnical testing results and evaluation.
- Bid specifications in Construction Specification Institute (CSI) format including:
 - Summary of work;
 - Submittal procedures;
 - Health and safety;
 - Decontamination;
 - Temporary facilities and controls;
 - Earthwork (which includes the excavation of PCB-impacted soil);
 - Excavation and fill;
 - Metal sheet piling; and
 - Transportation and disposal.

Based on the depth to water at the Site, as previously measured in groundwater monitoring wells and observed in soil borings, dewatering activities are not expected to be needed to complete the excavation (Figure 3-1).

Once remediation activities are complete, Watermark will perform a risk characterization and record a deed restriction as discussed in Section 3.2.10.

3.2.2 Site Preparation

In accordance with Massachusetts regulations, the area of excavation will be marked out and DigSafe notified a minimum of three business days prior to excavation activities commencing. Additionally, all required local permits will be obtained by the selected excavation contractor.

The Excavation Area is shown on Figure 2-2. The southern boundary of the Excavation Area is defined by the parcel boundary between Parcel 9 and New Street D, as PCB impacts to New Street D have already been addressed, as discussed in Section 2.1. Samples collected from borings, SB-102, SB-103, SB-104, SB-106, SB-202, SB-205, and TP-23 will serve as the lateral extents and post-excavation sidewall samples in the westerly, northerly, and easterly directions.

Site security will also be established prior to excavation to ensure that the general public cannot access the Site throughout the remediation effort. Part of the site security will be established by the perimeter fence located around the Site as required by the Site's AUL. The hot-zone will be delineated using high visibility construction fencing and/or barricades to deter authorized on-site personnel from unintentionally entering the hot zone. All personnel will enter and exit the hot zone through a clearly delineated Contaminant Reduction Zone where decontamination procedures will occur to mitigate the chance of tracking PCB-impacted soil or other items into the Support Zone.

Due to the steep grades and excavation depths at the Property, geotechnical information associated with the construction of New Road D will be used to help assist with the design of sheet piling necessary to access the impacted soils at the Property. The sheet piling will be installed along the southern parcel boundary as shown on Figure 2-2. Excavation supports are required by OSHA regulation based on the anticipated depth of the excavation. Additionally, based on the depth, the excavation supports must be designed by a Professional Engineer. These excavation supports will also serve to limit the disturbance of the new road, protect both the new road and the utilities, and protect on-site workers working in the vicinity of the excavation. Once the excavation has been properly backfilled and compacted, the sheet piling will be removed.

The location of the excavation area will be surveyed prior to excavation by a Massachusetts Licensed Professional Land Surveyor. The surveyor will also establish initial elevations of the ground surface prior to excavation. Throughout the excavation activities, elevations will be established and monitored by the excavation contractor.

3.2.3 Soil Excavation

The impacted soil will be excavated using standard excavation equipment. Watermark will be on-site providing oversight throughout the remediation activities to ensure adherence to this plan and the bid specifications. Excavation will occur only within the sheet-piling area and will be conducted in such a manner as to prevent the spilling of impacted soils onto the unimpacted ground surface. Soil within the sheet piling will be excavated in one-foot lifts to an elevation of 73 feet NGVD 1992, before backfilling. Prior to loading the soil onto trucks, the soil will be segregated and characterized as further explained in Section 3.2.6. All of the soil excavated between 82 feet and 73 feet NGVD will be assumed to be impacted by PCBs and handled, stockpiled, and disposed of as such. The excavated soil will be subsequently loaded onto trucks and transported to a permitted off-site disposal facility. Soil excavated from above elevation 82 feet NGVD 1992 will be stockpiled for reuse at the Site. The excavation, transportation and disposal will be conducted under the guidance of a Licensed Site Professional (LSP) to ensure that remediation activities are conducted in accordance with the MCP, and a RAM Plan. The excavation area will then be backfilled to existing grade using the non-impacted soil which was excavated and stockpiled from above elevation 82 feet NGVD 1992 as well as clean geotechnically suitable, imported backfill material to make up the difference.

Groundwater in this area of the Property is at elevation 71.0 NGVD 1992; therefore, dewatering will likely not be needed during the excavation. Excavation of six cells of soil (each 10-feet by 10-feet by 2-feet) will generate an estimated 44 cubic yards (or 66 tons) of soil (in-place) for off-site disposition. Since additional soil will need to be removed and disposed of in order to remove the targeted soil in each of the six cells, the proposed amount of soil to be disposed of is estimated to be up to approximately 315 cubic yards (or 472.5 tons).

3.2.4 Environmental Monitoring

Environmental monitoring will occur regularly throughout the excavation activities. Discrete air monitoring stations will be designated around the Site, and will be visited on a regular basis to screen ambient air. Ambient air will be screened for VOCs using a PID and dust using a personal DataRAM monitor. Additionally, the breathing zone of the on-site workers will also be monitored for dust and VOCs throughout the excavation activities in accordance with a site specific health and safety plan.

Dust action levels for the Site for PM₁₀ particulates (e.g. particles whose aerodynamic diameter is less than 10 micrometers) have been set at 0.012 milligrams per cubic meter sustained for 30 minutes at the fence line. This level was calculated using the maximum concentration of PCBs in soil at the Site, 2,200 mg/kg. The conservative calculations used to determine exposure concentrations for carcinogenic and non-carcinogenic effects to respirable dust assuming the dust is 100% PCBs are included in Appendix E. The action level for VOCs in air is 5 ppmV sustained for 5 minutes based on OSHA's short-term exposure limit of 5 ppm for vinyl chloride. Although vinyl chloride is not a contaminant of concern at the Site, chlorinated VOCs have been detected in groundwater at the Property, so the most conservative action level was adopted.

If VOC levels in the breathing zone or at one of the air monitoring stations exceed the established action levels, then work will stop until proper steps [either allowing the air to clear or donning additional Personal Protective Equipment (PPE)] will be taken to protect on-site workers. If dust or VOC levels exceed the established action levels, then dust suppression measures will be implemented to reduce fugitive dust or VOCs to within acceptable levels. Dust and VOC suppression methods may include, but are not limited to; dampening the soil with water, applying foam, covering stockpiled materials (portions of the stockpile may be uncovered if the pile is still actively being used), reducing the speed of work to reduce the amount of dust or VOCs released, or, if necessary, ceasing work until wind levels reduce to a speed which will no longer cause the release of fugitive dust or VOCs from the Site.

3.2.5 Post-Excavation Confirmatory Soil Sampling

All excavation activities will be based on elevation as determined by the pre-characterization samples. After the excavation(s) have reached their projected limits, Watermark will collect post-excavation confirmatory soil samples from the bottom of the excavation on a five-foot grid pattern in accordance with 40 CFR 761.283(b)(2) to confirm that the excavation has met its objective. Grab samples will be collected from discrete locations, not composited, to a depth of 3-inches below the surface (bottom) of the excavation. Post-excavation soil samples

will be analyzed for PCBs via EPA Method 8082 using extraction method 3540C, the soxhlet extraction method. Samples will be collected and analyzed in accordance with the RAM Plan which will serve as the SS-QAPP Addendum to Watermark's Generic Brownfields QAPP. In accordance with the RAM Plan, which will be submitted to the USEPA under separate cover, one duplicate sample will be collected for every 20 soil samples. Additionally, one equipment rinsate sample will be collected from a decontaminated piece of sampling equipment after every 20 soil samples.

Post-excavation confirmatory sidewall samples will not be collected as existing soil data from the following borings will serve as sidewall samples: SB-102, SB-103, SB-104, SB-106, SB-202, SB-205, and TP-23.

3.2.6 On-site Material Handling and Storage

Excavated soils will be stored on-site until they are reused during the backfilling process, or are shipped off-site for proper disposition. As stated in Section 2.2.1, PCB-impacted soils at the Site were recently covered with approximately 10 feet of clean fill material. Soil which is excavated from this clean fill layer above elevation 82 feet NGVD 1992, will be stored on-site in a stockpile deemed the Recently Placed Fill Stockpile. In order to assure that PCB-impacted soil is not accidentally placed in the Recently Placed Fill Stockpile, a target depth for the point in which soils should be excavated as if impacted by PCBs has been conservatively set at 82 feet NGVD 1992, one or more feet above the PCB-impacted soil. Once the target elevation of 82 feet NGVD 1992 has been reached, all excavated materials will be placed in a second, completely separate, stockpile deemed the PCB-Impacted Soil Stockpile. The PCB-Impacted Soil Stockpile will be characterized for disposal purposes as described in the following section. All soil within the PCB-Impacted Soil Stockpile will be disposed of as soil with greater than 50 ppm PCB, based on the pre-characterization of the soil.

All stockpiled materials at the Site will be stored on 6-mil polyethylene (poly) sheeting with berms around the edges of each individual stockpile to prevent possible run-off from impacting downstream receptors. When soil is not actively being added to or removed from a stockpile, the stockpile will remain covered with the cover secured. Stockpiles will be staged on the northern edge of the Site in the Stockpile Area as identified on Figure 1-3. As a secondary control measure, hay bales or other filtering material (filter fabric) will be placed between the Stockpile Area and the Lower Pawtucket Canal to prevent any possible runoff from entering the canal.

3.2.7 Waste Characterization Sampling

After excavation and staging, soil in the PCB-Impacted Soil Stockpile will be collected and analyzed at an off-site laboratory for waste characterization parameters likely including the following: TCLP RCRA 8 metals via EPA Method 1311 and EPA Method 6000/7000 series, total RCRA 8 metals via EPA Method 6000/7000 series, VOCs via EPA Method 8260, SVOCs via EPA Method 8270, PCBs via EPA Method 8082 (extraction by method 3540C), Pesticides via EPA Method 8081, Herbicides via EPA Method 8151, Ignitability via EPA Method 1010, Flammability via EPA Method 1010, Corrosivity via EPA Method 9045, and pH via EPA Method 9045.

3.2.8 On-Site Reuse of Materials

Soils excavated from above elevation 82 feet NGVD 1992 will be used as the initial layer of backfill in the excavation. After this soil is compacted, it will be covered with clean, geotechnically suitable, imported, and verified clean backfill material, or other fill material which has been tested and found to be suitable for reuse.

3.2.9 Off-Site Transportation and Disposal of Soil

After the PCB-impacted soil has been properly waste characterized and accepted for disposal by the receiving facility, it will be loaded onto trucks and transported for off-site disposition (by others under a separate contract with the City) at a TSCA-approved landfill. Watermark will coordinate with the City's contractor to ensure the proper paperwork is completed and submitted to the USEPA and the MassDEP following delivery to the receiving facility.

3.2.10 Post Remediation Activities

Once all excavation activities are complete, Watermark will perform a risk assessment for the Site based on post-excavation conditions, and a deed restriction will be recorded for the Site at the Middlesex County Registry

of Deeds. The deed restriction will state that the Site is being closed with an Interim Cap as it is a low occupancy area⁵. The deed restriction will also state that prior to any development activities, the USEPA will be notified that the Site will be developed into a high occupancy area, and construction at the Site will meet the cap requirements under CFR 761.61 (a)(7), CFR 761.75 (b), and CFR 264.310 (a). In addition, the existing AUL, which was filed as part of the partial Class B2 RAO, will be reviewed to determine if it needs to be amended.

⁵ Although the clean-up level of 10 ppm is based on a High-Occupancy Area, and the cap will meet the cap requirements of a High-Occupancy Area, the deed restriction will state that it is an Interim Cap for a Low-Occupancy Area. By recording it as such, the USEPA will be notified and involved in the capping process during redevelopment of the Site for residential purposes (High Occupancy).

TABLES

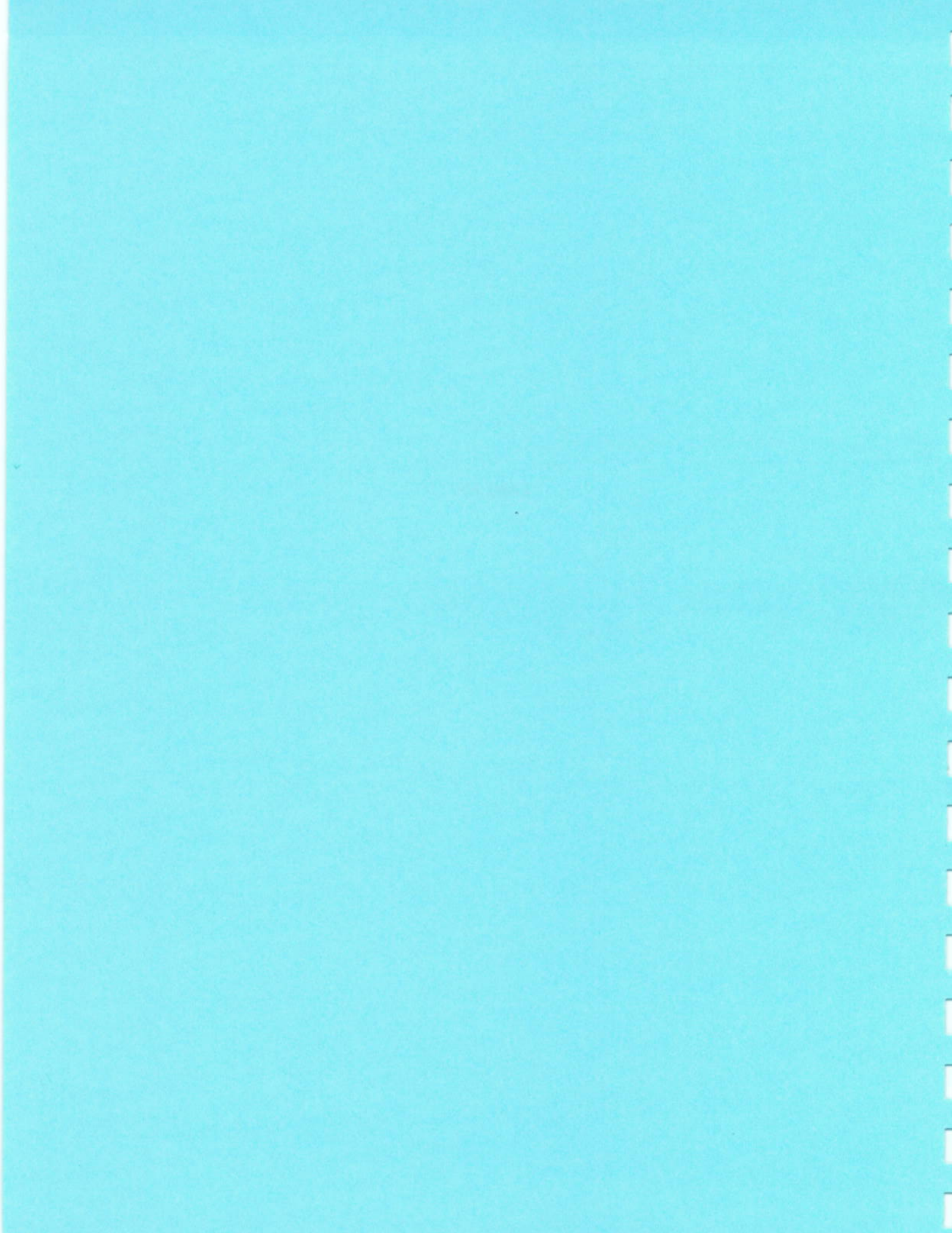


Table 2-1
Summary of PCBs in Soil Sample Results - Adjacent Parcels
Self-Implementing Clean Up Plan - Revision 1
239.1 Jackson Street, Lowell, Massachusetts

[illegible]

Only anoxia detected are presumed

ND = Not detected above the lab reporting limits shown in parentheses.

NSCA = Toxic Substance Control Act of the United States Environmental Protection Agency

IOA = High Occupancy Area as defined by the IIRW Center of Expertise | Environmental Regulatory | Page Sheet 99-106

Bolded values exceed the TSCA Cleanup Criteria for HQA

Samples from Borings SB-110 through SB-114 were analyzed via the PCB Extraction Method 3546

levation in feet NGVD 1992 as surveyed by Dana Perkins, Inc. on June 30, 2006 and October 13, 2010.

- Sample TP-304 S-2 (2-4) was replaced by sample SIB-112 (A-0) which was sampled in the same location as various examined, inserted from SOURCEFACE FACILITY PLAN by McPhail Associates, dated July 2010

Age group	Percentage of respondents
18-29	65
30-39	70
40-49	75
50-59	80
60-69	85
70-79	88
80+	90

Prepared by: JPK

Received 10 July 1998; accepted 10 July 1998

Table 2-1
Summary of PCBs in Soil Sample Results - Adjacent Parcels
Self-Implementing Clean Up Plan - Revision 1
239.1 Jackson Street, Lowell, Massachusetts

PARCEL 8									
Sample Location	MW-41			MW-41			SB-110		
Sample Name	Soil Cleanup Standards			Soil Cleanup Standards			Soil Cleanup Standards		
Sampling Date	MW-41 EC-5	MW-41 EC-5	MW-41 EC-5	MW-41 EC-5	MW-41 EC-5	MW-41 EC-5	MW-41 EC-5	MW-41 EC-5	MW-41 EC-5
Sample Depth	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
Top of Sample Hole	77.2	76.9	77.2	76.9	77.2	76.9	77.2	76.9	77.2
Bottom of Sample	75.2	74.9	75.2	74.9	75.2	74.9	75.2	74.9	75.2
Analysis Date	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Analysis Date	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)

PARCEL 8 (Continued)									
Sample Location	SB-112			SB-113			SB-114		
Sample Name	Soil Cleanup Standards			Soil Cleanup Standards			Soil Cleanup Standards		
Sampling Date	SB-112 EC-5	SB-112 EC-5	SB-112 EC-5	SB-113 EC-5	SB-113 EC-5	SB-113 EC-5	SB-114 EC-5	SB-114 EC-5	SB-114 EC-5
Sample Depth	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
Top of Sample Hole	77.2	76.9	77.2	76.9	77.2	76.9	77.2	76.9	77.2
Bottom of Sample	75.2	74.9	75.2	74.9	75.2	74.9	75.2	74.9	75.2
Analysis Date	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Analysis Date	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)

PARCEL 8 (Continued)									
Sample Location	SB-301			SB-302			SB-303		
Sample Name	Soil Cleanup Standards			Soil Cleanup Standards			Soil Cleanup Standards		
Sampling Date	SB-301 EC-5	SB-301 EC-5	SB-301 EC-5	SB-302 EC-5	SB-302 EC-5	SB-302 EC-5	SB-303 EC-5	SB-303 EC-5	SB-303 EC-5
Sample Depth	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
Top of Sample Hole	77.2	76.9	77.2	76.9	77.2	76.9	77.2	76.9	77.2
Bottom of Sample	75.2	74.9	75.2	74.9	75.2	74.9	75.2	74.9	75.2
Analysis Date	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)
Analysis Date	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)

Only results detected are presented

ND = Not Detected above the lab reporting limits shown in parentheses.
 ISCA = Toxic Substance Control Act of the United States Environmental Protection Agency
 IDA = High Occupancy Area as defined by the ERM Center of Expertise Environmental Regulatory Test Sheet 99.46
 Bolded values exceed the ISCA Cleanup Criteria for IDA
 Samples from Borings SB-110 through SB-114 were analyzed via the PCB Extraction Method 5566
 * Laboratory Method 5566 was performed by McPaul Associates, dated July 2010
 1 - Sample TP-304 S-2 (2-3) was analyzed by sample SB-112 (6-9) which was analyzed in the same location

Prepared by JPR
 Checked by ELM

Table 2-2
Summary of PCBs in Soil Sample Results- Parcel 9
Self-Implementing Clean Up Plan - Revision 1
239.1 Jackson Street, Lowell, Massachusetts

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	MW-2L/EC-S-6	MAL-13	MAL-14	MAL-13	MAL-14	TP-21 SI	TP-22 SI	TP-23 SI
Sample Name										
Sampling Date										
Sample Depth										
Top of Sample Elevation										
Bottom of Sample Elevation										
PCB 1254	3	10	4.13, 2006 0.47	8.28, 2009 0.2	8.28, 2009 0.2	8.28, 2009 0.2	8.28, 2009 0.2	5.28, 2009 0.5	5.28, 2009 0.5	5.28, 2009 0.5
PCB 1260	3	10	74.8 72.4	77.7 77.7	77.7 77.7	77.7 77.7	77.7 77.7	77.7 77.7	77.7 77.7	77.7 77.7
			0.0657	0.086	0.086	0.086	0.086	0.086	0.086	0.086

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-101	SB-101A	SB-101A	SB-101A	SB-102	SB-102	SB-102	SB-102
Sample Name										
Sampling Date										
Sample Depth										
Top of Sample Elevation										
Bottom of Sample Elevation										
PCB 1254	3	10	17.7, 75 7.7, 75	9.9, 2010 9.1, 1	9.9, 2010 9.1, 1	9.9, 2010 9.1, 1	9.9, 2010 9.1, 1	9.9, 2010 9.1, 1	9.9, 2010 9.1, 1	9.9, 2010 9.1, 1
PCB 1260	3	10	75.92 1.8	72.67 2.5	72.67 2.5	72.67 2.5	72.67 2.5	72.67 2.5	72.67 2.5	72.67 2.5
			ND (0.21)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-103	SB-103	SB-103	SB-103	SB-104	SB-104	SB-104	SB-104
Sample Name										
Sampling Date										
Sample Depth										
Top of Sample Elevation										
Bottom of Sample Elevation										
PCB 1254	3	10	10-12 Feet 80.85	12-13.3 Feet 78.85	12-13.3 Feet 78.85	12-13.3 Feet 78.85	12-13.3 Feet 78.85	12-13.3 Feet 78.85	12-13.3 Feet 78.85	12-13.3 Feet 78.85
PCB 1260	3	10	4.3 ND (0.53)	2.5 ND (0.55)	2.5 ND (0.55)	2.5 ND (0.55)	2.5 ND (0.55)	2.5 ND (0.55)	2.5 ND (0.55)	2.5 ND (0.55)

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-105	SB-105	SB-105	SB-105	SB-106	SB-106	SB-106	SB-106
Sample Name										
Sampling Date										
Sample Depth										
Top of Sample Elevation										
Bottom of Sample Elevation										
PCB 1254	3	10	10-12 Feet 80.95	12-14 Feet 78.95	12-14 Feet 78.95	12-14 Feet 78.95	12-14 Feet 78.95	12-14 Feet 78.95	12-14 Feet 78.95	12-14 Feet 78.95
PCB 1260	3	10	4 ND (2.2)	4 ND (0.56)	4 ND (0.56)	4 ND (0.56)	4 ND (0.56)	4 ND (0.56)	4 ND (0.56)	4 ND (0.56)

NOTES:

Only analytes detected are presented
 ND = Not detected above the lab reporting limits shown in parentheses.
 TSCA = Toxic Substance Control Act of the United States Environmental Protection Agency
 HOA = High Occupancy Area as defined by the HTRW Center of Expertise Environmental Regulatory Fact Sheet 99-06
 J = Estimated value
 Bolded values exceed the TSCA Cleanup Criteria for HOA
 Samples from Borings SB-101 through SB-109 and SB-201 through SB-205 were extracted via the PCB Soxhlet Extraction Method 3540C; Samples from Borings SB-110 through SB-114 were analyzed via the PCB Extraction Method 3546
 Elevation in feet NGVD 1992 as surveyed by Dana Perkins, Inc. on October 13, 2010.
 * Minimum laboratory reporting limit exceeds one or more of the regulatory criteria.
 1 - Sample TP-22 SI (0.5) was replaced by samples SB-107 (10-12) and SB-107 (12-3) which were collected from the same location

Prepared by: ELM
 Checked by: LKI

Table 2.2

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-108 (10-12)	SB-108 (12-14)	Dup-2	SB-108 (14-16)	SB-108 (16-17.3)	SB-108 (19-21)	SB-109 (10-12)	Dup-3	SB-109 (12-13.5)	SB-109 (14-16)	SB-109 (16-16.3)	SB-109 (19-21)
Sample Name	Sampling Date	Sample Depth	Top of Sample Elevation	Bottom of Sample Elevation	PCB 1254	PCB 1260	3	3	10	10	10	10	10	10
			9/7/2010	10-12 Feet	81.48	79.48	77.48	74.18	73.48	81.19	79.19	77.19	75.19	73.19
			9/7/2010	12-14 Feet	79.48	77.48	74.18	72.48	71.48	79.19	77.19	75.19	73.19	71.19
			9/7/2010	14-16 Feet	77.48	75.48	74.18	72.48	71.48	79.19	77.19	75.19	73.19	71.19
			9/7/2010	16-17.3 Feet	75.48	74.18	72.48	71.48	70.19	79.19	77.19	75.19	73.19	71.19
			9/7/2010	19-21 Feet	73.48	71.48	70.19	69.19	68.19	79.19	77.19	75.19	73.19	71.19
			9/8/2010	10-12 Feet	81.19	79.19	77.69	76.19	75.19	79.19	77.19	75.19	73.19	71.19
			9/8/2010	12-13.5 Feet	79.19	77.19	75.69	74.19	73.19	79.19	77.19	75.19	73.19	71.19
			9/8/2010	14-16 Feet	77.19	75.19	73.69	72.19	71.19	79.19	77.19	75.19	73.19	71.19
			9/8/2010	16-18 Feet	75.19	73.19	71.69	70.19	69.19	79.19	77.19	75.19	73.19	71.19
			9/8/2010	18-19.75 Feet	73.19	71.19	69.69	68.19	67.19	79.19	77.19	75.19	73.19	71.19
			9/8/2010	22-24 Feet	71.19	69.19	67.69	66.19	65.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	10-12 Feet	81.19	79.19	77.69	76.19	75.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	12-14 Feet	79.19	77.19	75.69	74.19	73.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	14-16 Feet	77.19	75.19	73.69	72.19	71.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	16-17.25 Feet	75.19	73.75	71.19	69.19	67.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	18-20 Feet	73.19	71.19	69.19	67.19	65.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	22-24 Feet	71.19	69.19	67.19	65.19	63.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	26-28 Feet	69.19	67.19	65.19	63.19	61.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	30-32 Feet	67.19	65.19	63.19	61.19	59.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	34-36 Feet	65.19	63.19	61.19	59.19	57.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	38-40 Feet	63.19	61.19	59.19	57.19	55.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	42-44 Feet	61.19	59.19	57.19	55.19	53.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	46-48 Feet	59.19	57.19	55.19	53.19	51.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	50-52 Feet	57.19	55.19	53.19	51.19	49.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	54-56 Feet	55.19	53.19	51.19	49.19	47.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	58-60 Feet	53.19	51.19	49.19	47.19	45.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	62-64 Feet	51.19	49.19	47.19	45.19	43.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	66-68 Feet	49.19	47.19	45.19	43.19	41.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	70-72 Feet	47.19	45.19	43.19	41.19	39.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	74-76 Feet	45.19	43.19	41.19	39.19	37.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	78-80 Feet	43.19	41.19	39.19	37.19	35.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	82-84 Feet	41.19	39.19	37.19	35.19	33.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	86-88 Feet	39.19	37.19	35.19	33.19	31.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	90-92 Feet	37.19	35.19	33.19	31.19	29.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	94-96 Feet	35.19	33.19	31.19	29.19	27.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	98-100 Feet	33.19	31.19	29.19	27.19	25.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	102-104 Feet	31.19	29.19	27.19	25.19	23.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	106-108 Feet	29.19	27.19	25.19	23.19	21.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	110-112 Feet	27.19	25.19	23.19	21.19	19.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	114-116 Feet	25.19	23.19	21.19	19.19	17.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	118-120 Feet	23.19	21.19	19.19	17.19	15.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	122-124 Feet	21.19	19.19	17.19	15.19	13.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	126-128 Feet	19.19	17.19	15.19	13.19	11.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	130-132 Feet	17.19	15.19	13.19	11.19	9.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	134-136 Feet	15.19	13.19	11.19	9.19	7.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	138-140 Feet	13.19	11.19	9.19	7.19	5.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	142-144 Feet	11.19	9.19	7.19	5.19	3.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	146-148 Feet	9.19	7.19	5.19	3.19	1.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	150-152 Feet	7.19	5.19	3.19	1.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	154-156 Feet	5.19	3.19	1.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	158-160 Feet	3.19	1.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	162-164 Feet	1.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	166-168 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	170-172 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	174-176 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	178-180 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	182-184 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	186-188 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	190-192 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	194-196 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	198-200 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	202-204 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	206-208 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	210-212 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	214-216 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	218-220 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	222-224 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	226-228 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	230-232 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	234-236 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	238-240 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	242-244 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	246-248 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	250-252 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	254-256 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	258-260 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	262-264 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	266-268 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	270-272 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	274-276 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	278-280 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	282-284 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	286-288 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	290-292 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	294-296 Feet	0.19	0.19	0.19	0.19	0.19	79.19	77.19	75.19	73.19	71.19
			10/14/2010	298-300 Feet	0.19	0.19	0.19							

An asterisk (*) following a detection limit indicates that the minimum laboratory reporting limit exceeds one or more of the regulatory criteria.

ND = Not detected above the lab reporting limits shown in parenthesis.

IOA = High Occupancy Assessment of the United States Environmental Protection Agency

= Estimated value

Estimated Value
Dollars Value entered at: 0000000000

Some values exceed the TSCA Clean-up Criteria for HOA

Free-flow borings SB-101 through SB-109 and SB-201 through SB-205 were exten-

*Elevations not surveyed, inferred from 1992 survey.

Subsurface Excavation Plan" by McPhail Associates, dated July 2010.

Prepared by: ELM

Checked by: LKT

Table 2-3
Summary of Groundwater Results
Self-Implementing Clean Up Plan - Revision 1
239.1 Jackson Street, Lowell, Massachusetts

LOCATION		MAI-14	MW-1R/ ECS-8	MW-1L/ ECS-7	MW-1L/ ECS-7	MW-2L/ ECS-6	MW-2R/ ECS-3	MW-3L/ ECS-5
SAMPLING DATE		9/1/2009	4/24/2006	4/24/2006	6/20/2006	4/24/2006	4/24/2006	4/24/2006
SAMPLED BY		MAI	ECS	ECS	Watermark	ECS	Watermark	ECS
Polychlorinated Biphenyls (ug/l)	RCGW-2							
Arochlor 1016-1268	5	ND(0.307)	ND(0.0204)	ND(0.0204)	ND(0.2)	ND(0.022)	ND(0.025)	ND(0.0208)

LOCATION		MW-3R/ ECS-2	MW-3R/ ECS-2	MW-3R/ ECS-2	MW-4L/ ECS-4	MW-4R/ ECS-1	MW-4R/ ECS-1
SAMPLING DATE		4/24/2006	6/21/2006	9/1/2009	4/24/2006	4/24/2006	6/21/2006
SAMPLED BY		ECS	Watermark	MAI	ECS	Watermark	Watermark
Polychlorinated Biphenyls (ug/l)	RCGW-2						
Arochlor 1016-1268	5	ND(0.0253)	ND(0.2)	ND(0.266)	ND(0.0225)	ND(0.024)	ND(0.2)

Notes

RCGW-2 is the Replicable Concentration for GW-2 category groundwater

MAI - McPhail and Associates, Inc

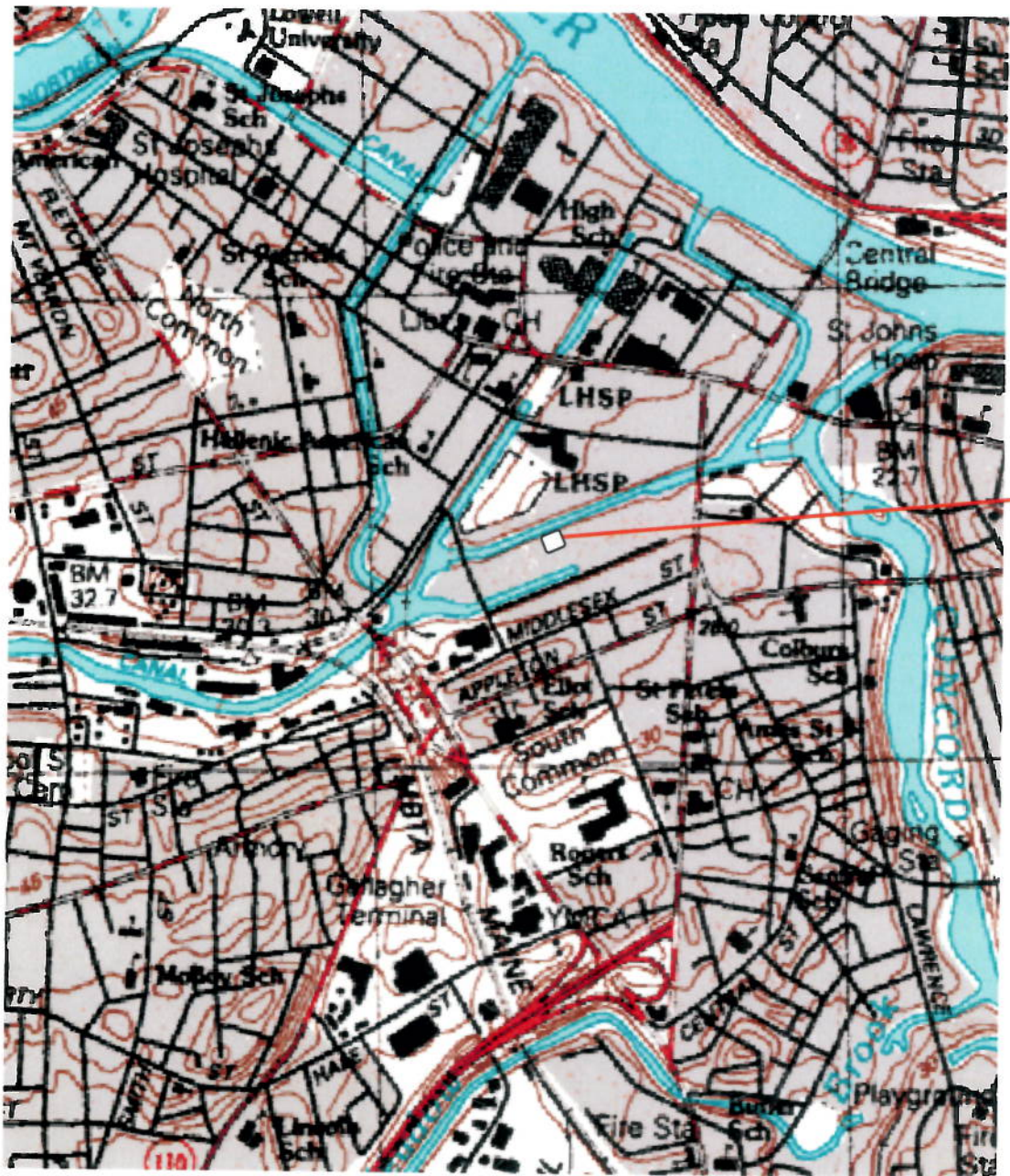
ECS - Environmental Compliance Services, Inc

Watermark - Watermark Environmental, Inc.

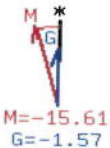
Prepared by ELM

Checked by OW

FIGURES



Site Location

SITE LOCATION MAP			
Parcel 9 239.1 Jackson Street Lowell, Massachusetts			
	Self-Implementing Cleanup Plan – Revision 1	Scale: 1:25,000 Source: www.trails.com Note: Site location outline depicts general Site location; see Figure 1-2 for parcel boundaries.	FIGURE 1-1

MARK	DATE	DESCRIPTION

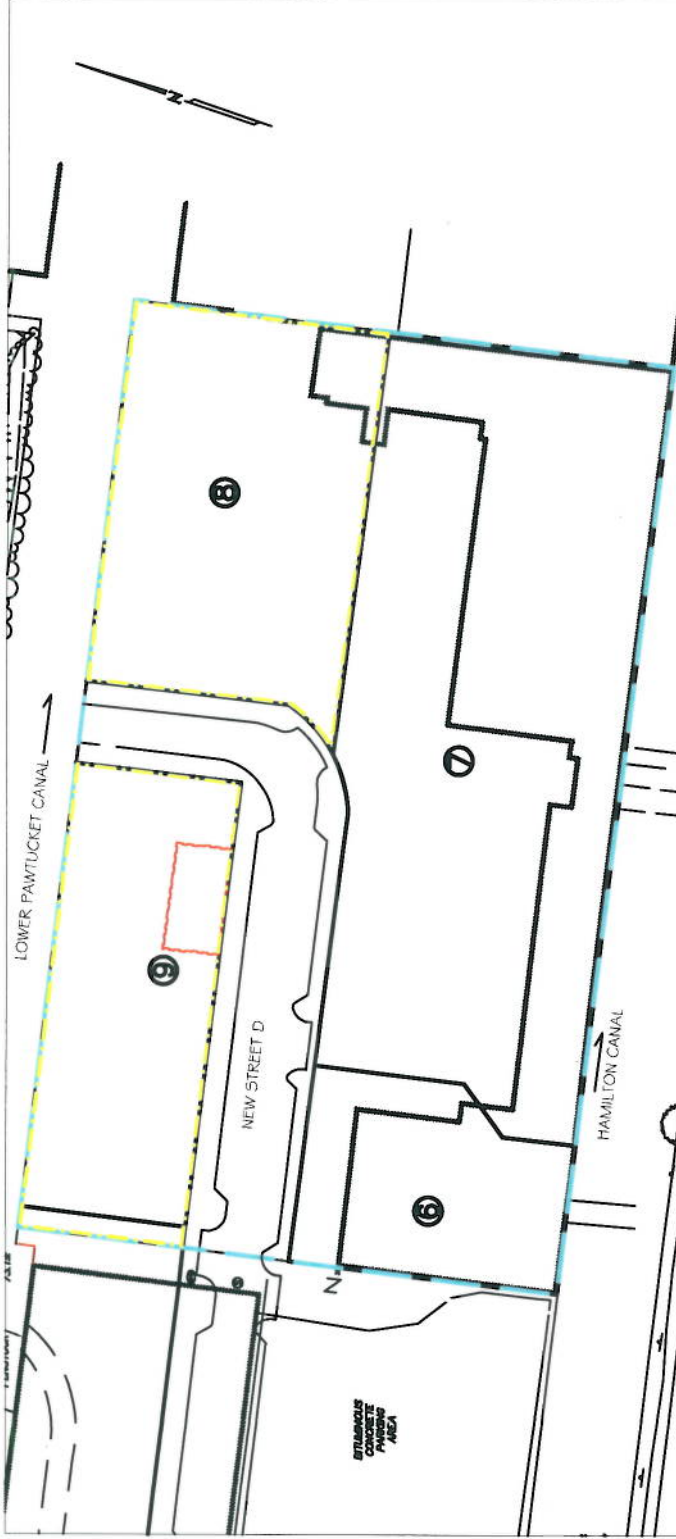
PROJECT NO: 11405-02
 MODEL FILE: Figure 1-2.dwg
 DRAWN BY: MEJ
 CHK'D BY: ELM
 COPYRIGHT WATERMARK 2010

SHEET TITLE

STUDY AREA MAP

FIG. 1-2

SHEET 1 OF 1



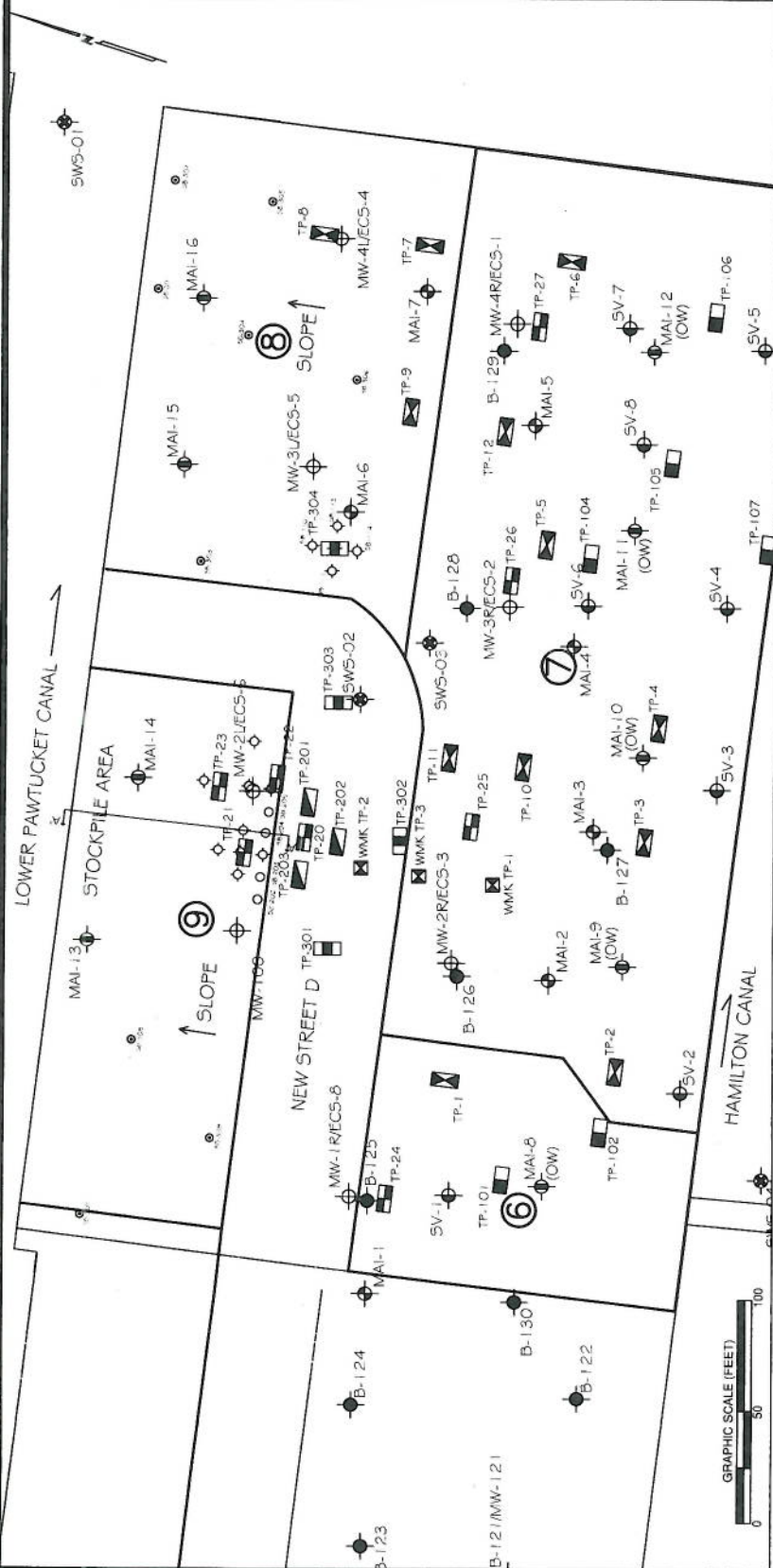
0 100' 200'
 Scale: 1" = 100'-0"

LEGEND

- THE REDEVELOPMENT AREA
- THE PROPERTY
- THE SITE
- APPROXIMATE LIMITS OF PARCEL BOUNDARY
- PARCEL NUMBER

Note: the figure depicts site structural features as recorded on February 8, 2008 and does not represent current site conditions

Reference: Base drawing was created by McPhail Associates, Inc. consulting geotechnical engineers.



- LEGEND**
- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY DB ENVIRONMENTAL SERVICES, INC. ON MAY 26, 2010 FOR MCPHAL ASSOCIATES, INC.
 - APPROXIMATE LOCATION OF TEST PIT PERFORMED BY DB ENVIRONMENTAL SERVICES, INC. DURING THE PERIOD OF MARCH 12 TO 17, 2009 FOR MCPHAL ASSOCIATES, INC.
 - APPROXIMATE LOCATION OF TEST PIT PERFORMED BY WATERMARK ON MARCH 12, 2009 FOR MCPHAL ASSOCIATES, INC.
 - APPROXIMATE LOCATION OF TEST PIT PERFORMED BY W. L. FRENCH ON MARCH 6 AND 7, 2008 FOR MCPHAL ASSOCIATES, INC.
 - APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. DURING MAY 27 TO JUNE 2, 2009 FOR MCPHAL ASSOCIATES, INC.
 - APPROXIMATE LOCATION OF TEST PIT PERFORMED BY DB ENVIRONMENTAL SERVICES ON 6/18/2010 FOR MCPHAL ASSOCIATES, INC.
 - APPROXIMATE LOCATION OF BORING PERFORMED BY NEW HAMPSHIRE BORING ON MARCH 11, 12, AND 13, 2003 FOR MCPHAL ASSOCIATES, INC.
 - APPROXIMATE LOCATION OF BORING PERFORMED BY OTHERS
 - APPROXIMATE LOCATION OF OBSERVATION WELL INSTALLED BY OTHERS
 - GEOLOGICAL CROSS-SECTION LOCATION (SEE FIGURE 3-1)
- APPROXIMATE LIMITS OF PARCEL BOUNDARY**
- ⑥ PARCEL NUMBER
 - ROUND 1 BORING
 - ROUND 2 BORING
 - MARCH 2012 BORING
- Note: the figure depicts site structural features as recorded on February 8, 2008 and does not represent current site conditions
- Reference: Base drawing was created by McPhail Associates, Inc. consulting geotechnical engineers.



Self-Implementing Cleanup
Plan - Revision 1
239.1
Jackson Street
Lowell, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO: 11405-02
MODEL FILE: Figure 1-3 307.dwg
DRAWN BY: MEJ
CHKD BY: ELM
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SHEET/TITLE

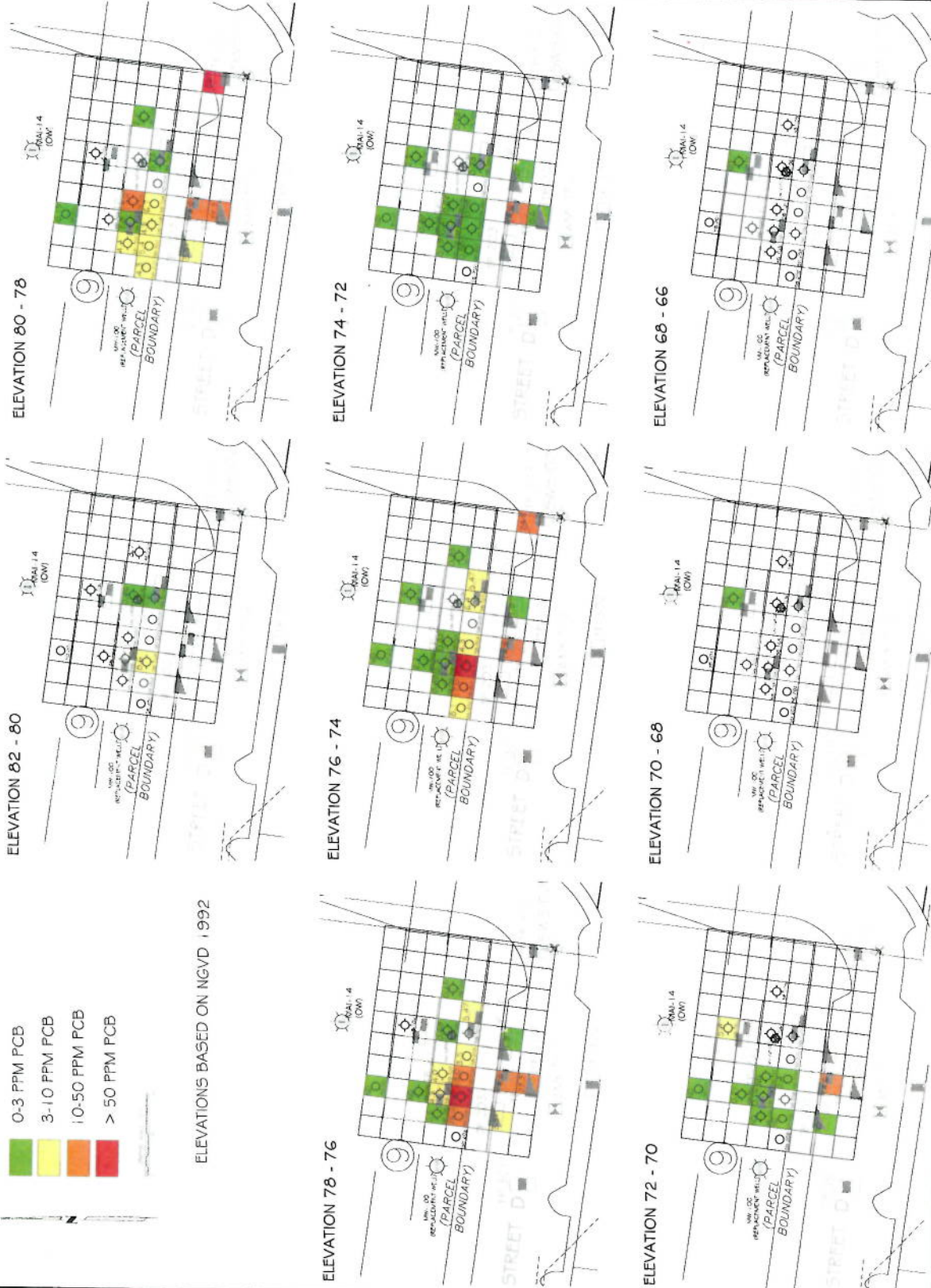
SITE PLAN

FIG.1-3
SHEET 1 OF 1

LEGEND

- 0-3 PPM PCB
- 3-10 PPM PCB
- 10-50 PPM PCB
- > 50 PPM PCB

ELEVATIONS BASED ON NGVD 1992



SELF IMPLEMENTING CLEAN UP PLAN
 Self-Implementing Cleanup
 Plan - Revision 1
 239.1 Jackson Street
 Lowell, Massachusetts

MARK DATE DESCRIPTION

PROJECT NO: 10025-00
 MODEL FILE: Figure 2-1.dwg
 DRAWN BY: ELM
 CHKD BY: OW
 COPYRIGHT WATERMARK 2010

SHEET TITLE

PCB CONCENTRATION
 BY ELEVATION

Fig. 2-1

